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Abstract
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N00014-93-1-1058

Theory and Observation of Ocean Fronts: Indian Ocean Drifters

As of August 1995, the entire Indian Ocean surface drifter array is in place. Delays in the initial deployments somewhat compromised the original plan to have the entire array in place prior to WHP work. The delays resulted in a problem with the PTT's from Telonics that cropped up in the NOAA funded southern ocean drifters. To be safe, the Indian Ocean drifters were held in storage while the problem was solved. A test of all of the units in Miami showed that they were all operational even though they were from a similar batch as those with clock problems in the southern ocean units. In the end, there were no drifter losses tied to the problem, but the timing of the array was shifted by approximately six months. The southern Indian gyre, the least known portion of the Indian Ocean circulation, was well seeded in the time frame of WHP. The lag was mostly felt in the northern Arabian Sea where deployment became tied to research vessels schedules and shipping issues. The array as of fall 1995 is shown in the enclosed figure. Redeployment resources are on line although uncertainties in NOAA funding may make future deployments a problem.

On the science side, there has been enough spare time in programmer time tied to the late deployments to allow completion of some of the work on the Pan-Pacific data set. There are several papers in preparation or review as listed below. The data base preparation required to complete similar analyses on the Indian Ocean have therefore been exercised. An issue is the synthesis of SVP data with altimetry. While there are several loose attempts to complete this in the Pacific, our analysis suggests that early TOPEX mean circulations are still full of geoid problems. This is clear in the extension of the Hawaiian ridge current up the hot spot trace in the TOPEX results while the surface currents and geostrophic estimates show retroflexion back to the east. The more complicated tectonics in the Indian Ocean suggest that the program needs better contact with the TOPEX community. This is being pursued. Other efforts, so that the combination of SVP surface currents and historical hydrographic data, allow a partition of the surface flow into geostrophic and Ekman components in the SVP data sets. Comparison of various wind products is also being completed by both Niiler and the Miami group. Finally, initial charting of the array during the onset phase suggests that the full array is very capable of mapping monsoon onset over the entire region. This is a potent test of the wind products and provides a view of the development of the monsoon that is impossible to achieve with traditional measurement techniques.